# Cognitive indigenization effects in the English dative alternation

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# Introduction

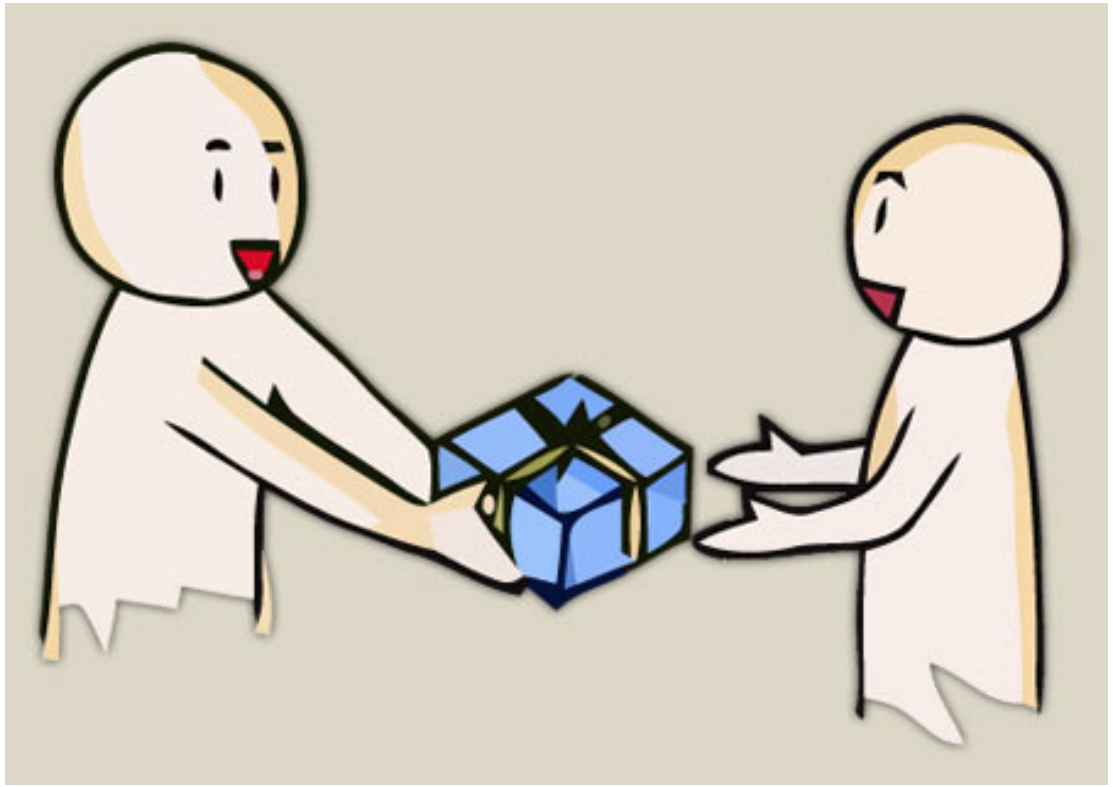
# Cognitive indigenization effects in the English dative alternation

# Cognitive indigenization

- nativization/indigenization = "the emergence of locally characteristic linguistic patterns" (Schneider 2007: 6)
- probabilistic indigenization = indigenization on the level of underlying stochastic patterns

# Cognitive indigenization effects in the English dative alternation

# The dative alternation



# The dative alternation

(1) ditransitive dative

He gives [Mary]$_{recipient}$ [a present]$_{theme}$

(2) prepositional dative

He gives [a present]$_{theme}$ to [Mary]$_{recipient}$

→ "alternate ways of saying 'the same' thing" (Labov 1972: 188)

# today

1. setting the frameworks
2. data & methods
3. analysis & results
4. discussion
5. outlook
6. unresolved issues

# setting the frameworks

# theoretical frameworks

- Probabilistic Grammar framework
  - grammar is gradient and probabilistic
  - constraint-based accounts
  - probabilistic indigenization

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  - cognitive factors and sociocultural factors both constrain linguistic variation, language planning, production, and comprehension
  - heterogeneity of language (different lects)
- Connection to: Psycholinguistic explanations
  - linguistic experience and statistical properties of the input shape language form

# previous research

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  - 'easy' comes first $\rightarrow$ congruent effect
  - easy $=$ animate, definite, pronominal, short

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- stability in probabilistic grammars
  - 'easy' comes first $\rightarrow$ congruent effect
  - easy = animate, definite, pronominal, short
- variability (indigenization) in probabilistic grammars
  - recipient animacy: NZE vs. AmE
  - end-weight: AmE vs. AusE

(e.g. Bresnan and Hay 2008; Bresnan and Ford 2010)

# research questions

- What is the extent to which varieties of English share a stable probabilistic grammar?
- Are some factors more amenable to regional differences than others?

# data & methods

# the corpus

- International Corpus of English (ICE) - series
- 60% spoken (transcriptions), 40% written texts
- 1m words per subcorpus
- 500 texts, 2,000 words per text
- 12 different registers, same corpus structure

# the data

- British E, Canadian E, Indian E, Singapore E, Irish E, New Zealand E, Hong Kong E, Jamaican E, Philippines E

# methods

(e.g. Bresnan et al. 2007)

1. extract dative tokens using verb list
2. define choice context (incl. pronouns), leave out, e.g.:
   - fixed and idiomatic expressions (e.g. *bring it to the boil*)
   - spatial goals (e.g. *send their daughter to school*)
   - beneficiaries (e.g. *We get them uh typed photo copies*)

$N$=8,549

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- verb sense: t, f, p, c, a

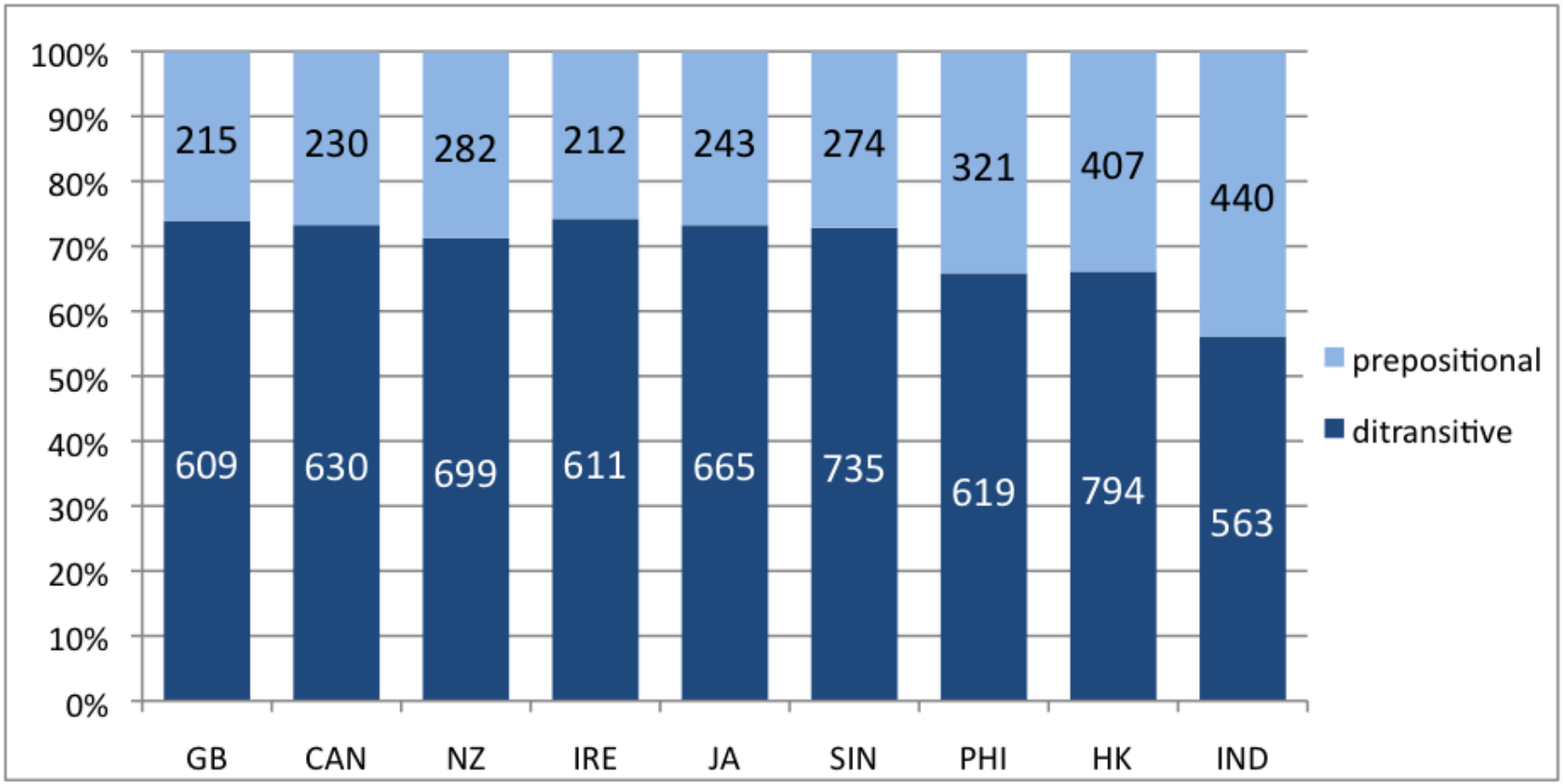
# explanatory factors

- verb sense
  - transfer: *I pay you ten dollars*
  - future transfer: *They award him a silver medal*
  - prevention: *I'll charge you some money*
  - communication: *I owe you an apology*
  - abstract: *Can you please pay attention to the graph*

# explanatory factors

- variety: BrE, CanE, SinE, etc.
- register
- corpus metadata: e.g. FileID, text category, etc.

# variety

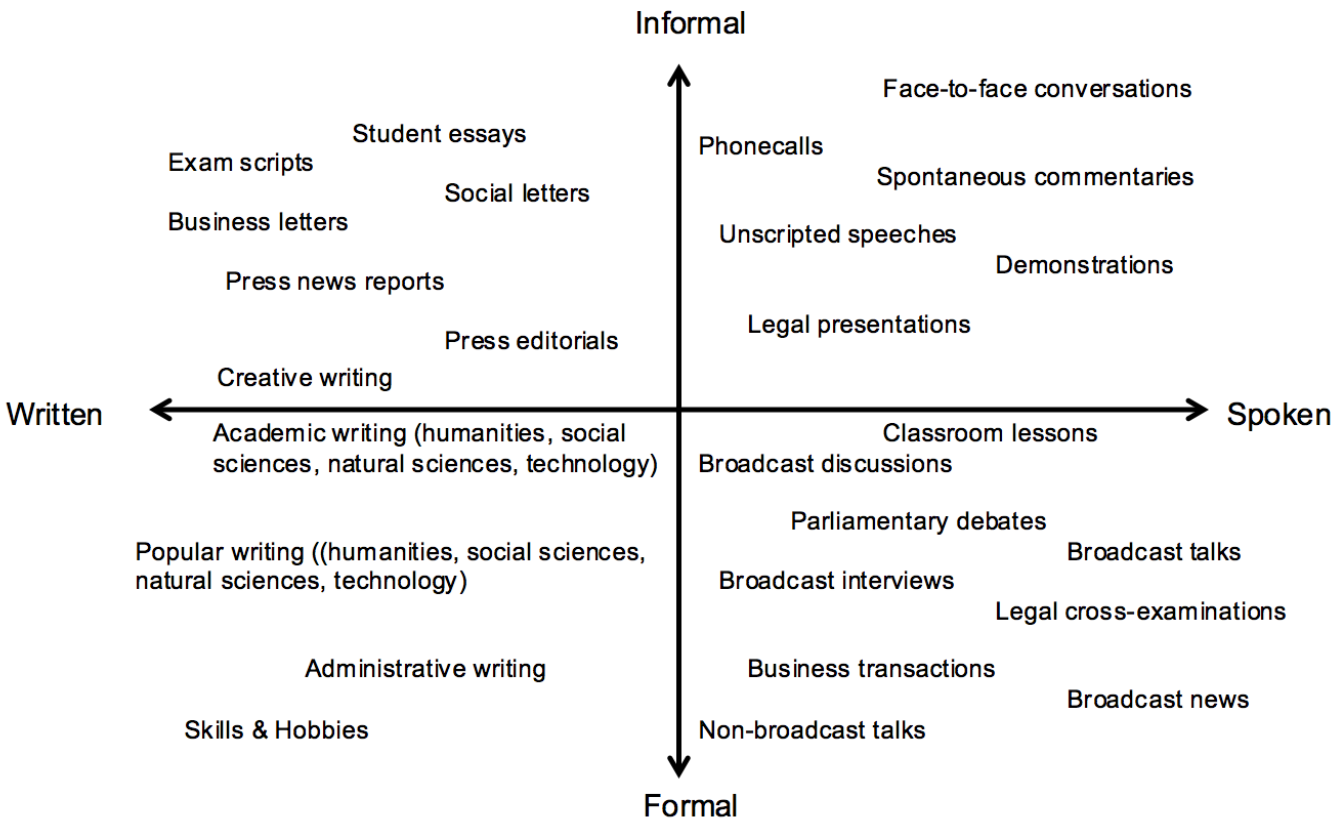



Dative proportions across all nine ICE corpora, $N$=8549

# register coding ICE

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **SPOKEN 300** | | Dialogues | 180 | Private | 100 | Face-to-face conversations | 90 | s1a |
| | | | | | | Phonecalls | 10 | |
| | | | | Public | 80 | Classroom lessons | 20 | s1b |
| | | | | | | Broadcast Discussions | 20 | |
| | | | | | | Broadcast Interviews | 10 | |
| | | | | | | Parliamentary Debates | 10 | |
| | | | | | | Legal cross-examinations | 10 | |
| | | | | | | Business Transactions | 10 | |
| | | Monologues | 120 | Unscripted | 70 | Spontaneous commentaries | 20 | s2a |
| | | | | | | Unscripted Speeches | 30 | |
| | | | | | | Demonstrations | 10 | |
| | | | | | | Legal Presentations | 10 | |
| | | | | Scripted | 50 | Broadcast News | 20 | s2b |
| | | | | | | Broadcast Talks | 20 | |
| | | | | | | Non-broadcast Talks | 10 | |
| **WRITTEN 200** | **200** | Non-printed | 50 | Student Writing | 20 | Student Essays | 10 | w1a |
| | | | | | | Exam Scripts | 10 | |
| | | | | Letters | 30 | Social Letters | 15 | w1b |
| | | | | | | Business Letters | 15 | |
| | | Printed | 150 | Academic writing | 40 | Humanities | 10 | w2a |
| | | | | | | Social Sciences | 10 | |
| | | | | | | Natural Sciences | 10 | |
| | | | | | | Technology | 10 | |
| | | | | Popular Writing | 40 | Humanities | 10 | w2b |
| | | | | | | Social Sciences | 10 | |
| | | | | | | Natural Sciences | 10 | |
| | | | | | | Technology | 10 | |
| | | | | Reportage | 20 | Press news reports | 20 | w2c |
| | | | | Instructional writing | 20 | Administrative Writing | 10 | w2d |
| | | | | | | Skills/Hobbies | 10 | |
| | | | | Persuasive writing | 10 | Press editorials | 10 | w2e |
| | | | | Creative writing | 20 | Novels & short stories | 20 | w2f |

# register coding in this study




(Koch and Oesterreicher 1985)

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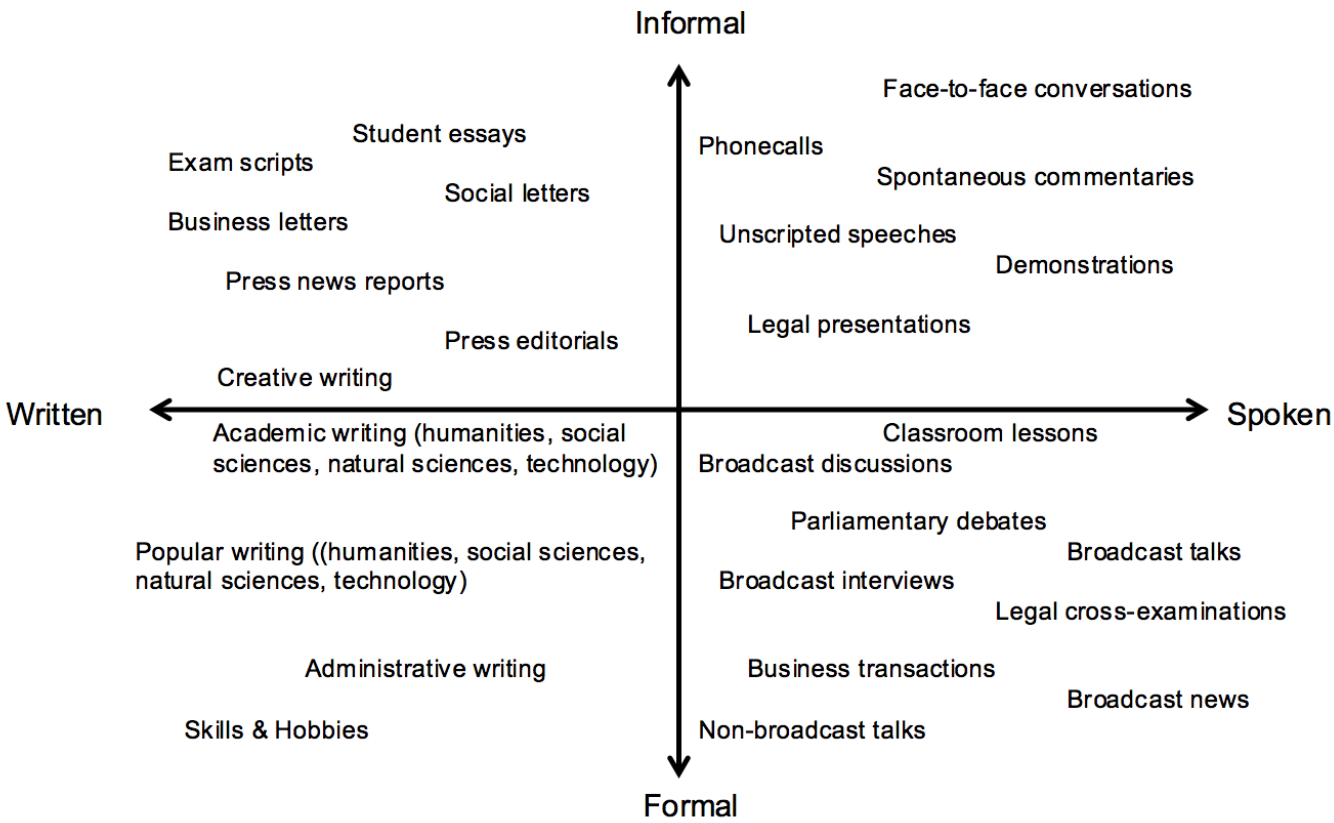



(Koch and Oesterreicher 1985)

4 levels → **SpokInf, SpokForm, WritInf, WritForm**

# analysis & results

# analysis

- mixed-effects logistic regression
- deviation coding for VARIETY and REGISTER: compare every level to the mean of ALL levels
- predicted outcome: prepositional dative
- `glmer()` function in Rs `lme4` package

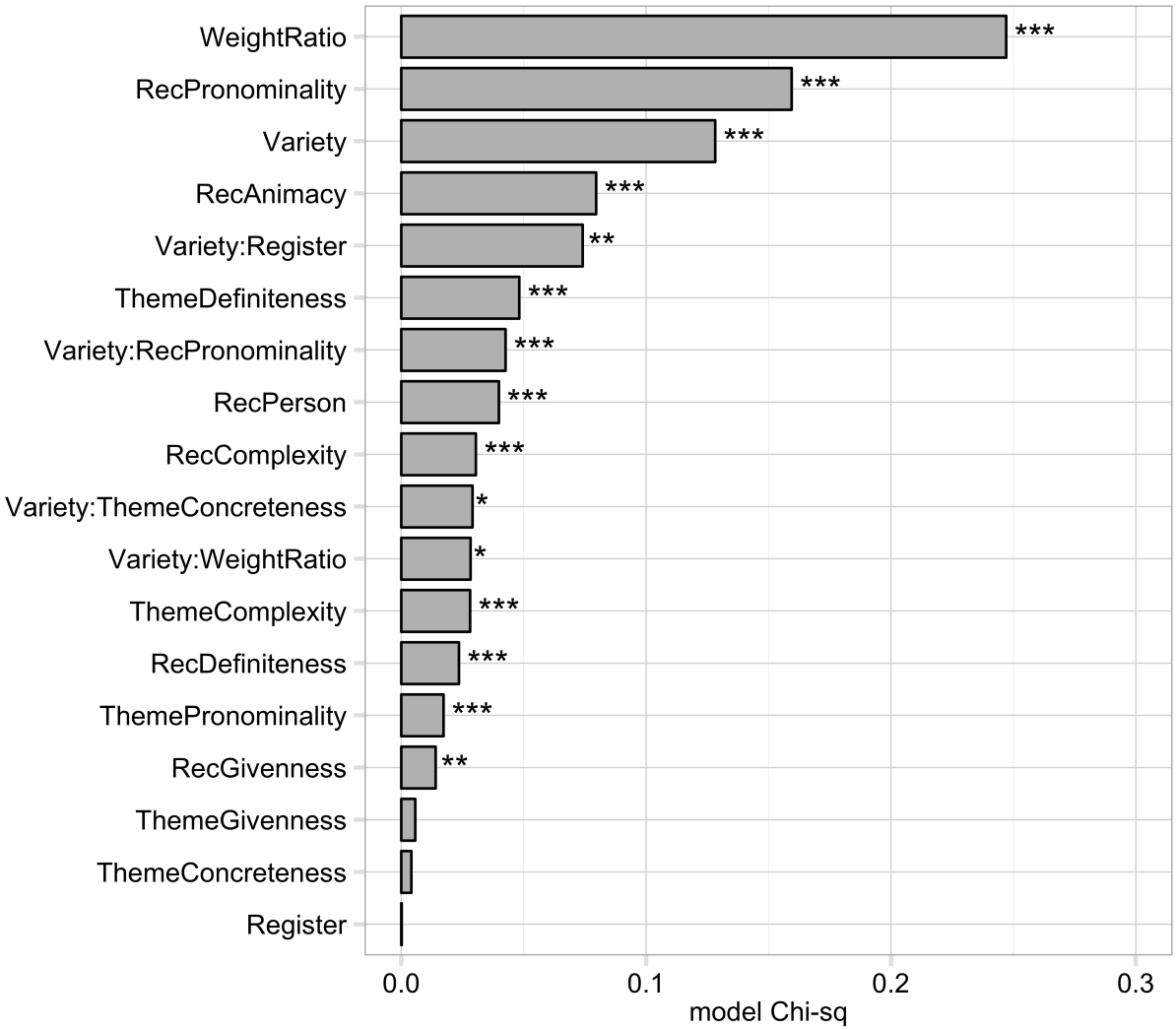
  (Bates, Maechler, and Bolker Bates et al.; Harrell 2001)
- random effects include
  - verb lemma and verb sense
  - corpus structure
  - recipient and theme head lemmas

# dative model

$$\text{Response} = \{\text{ditransitive, prepositional}\}$$

$$\begin{aligned}\text{Response} \sim\ & (1|\text{VerbLemma}/\text{VerbSense}) \\ & + (1|\text{ThemeHead}) \\ & + (1|\text{CorpusStructure}) \\ & + \text{RecComplexity} \\ & + \text{RecGivenness} \\ & + \text{ThemeComplexity} \\ & + \text{RecPerson} \\ & + \text{RecDefiniteness} \\ & + \text{ThemePron} \\ & + \text{RecAnimacy} \\ & + \text{ThemeGivenness} \\ & + \text{ThemeDefiniteness} \\ & + \text{Variety} * \\ & (\text{Register} + \text{RecPron} + \text{ThemeConcreteness} + \text{WeightRatio})\end{aligned}$$

# importance of predictors




Predicted outcome: PD; *C*-value: 0.98; Accuracy: 93.6% (baseline: 69 %)

# results

- What is the extent to which varieties of English share a stable probabilistic grammar?
- Are some factors more amenable to regional differences than others?

# main effects

| Predictor | b | SE | p |
|---|---|---|---|
| (intercept) | 2.525 | 0.405 | $<0.001$ |
| RECIPIENT COMPLEXITY | | | |
| simple $\Rightarrow$ complex | 0.898 | 0.204 | $<0.001$ |
| THEME COMPLEXITY | | | |
| simple $\Rightarrow$ complex | -0.692 | 0.164 | $<0.001$ |
| RECIPIENT PERSON | | | |
| local $\Rightarrow$ non-local | 0.882 | 0.175 | $<0.001$ |
| RECIPIENT ACCESSIBILITY | | | |
| given $\Rightarrow$ new | 0.388 | 0.130 | $<0.01$ |
| RECIPIENT ANIMACY | | | |
| animate $\Rightarrow$ inanimate | 0.994 | 0.140 | $<0.001$ |
| THEME PRONOMINALITY | | | |
| non-pronoun $\Rightarrow$ pronoun | 1.552 | 0.468 | $<0.001$ |
| RECIPIENT PRONOMINALITY | | | |
| pronoun $\Rightarrow$ non-pronoun | 1.945 | 0.191 | $<0.001$ |
| RECIPIENT DEFINITENESS | | | |
| definite $\Rightarrow$ indefinite | 0.556 | 0.144 | $<0.001$ |
| THEME DEFINITENESS | | | |
| indefinite $\Rightarrow$ definite | 0.696 | 0.126 | $<0.001$ |
| WEIGHT RATIO (rec/theme) | 2.950 | 0.230 | $<0.001$ |
| VARIETY | | | |
| all $\Rightarrow$ CanE | -1.586 | 0.365 | $<0.001$ |
| all $\Rightarrow$ IndE | 0.919 | 0.256 | $<0.001$ |

# main effects

- all predictors influence the choice of construction as predicted:
  - given >new
  - animate >inanimate
  - definite >indefinite
  - pron >non-pron
  - short >long

  recipient >theme $\rightarrow$ **ditransitive**

  theme >recipient $\rightarrow$ **prepositional**

# interactions

| Predictor | b | SE | p |
|---|---|---|---|
| VARIETY : RECIPIENT PRONOMINALITY | | | |
| CanE + non-pronoun | 0.902 | 0.402 | 0.025 |
| IndE + non-pronoun | 1.108 | 0.353 | 0.002 |
| JamE + non-pronoun | -1.253 | 0.402 | 0.002 |
| VARIETY : WEIGHT | | | |
| IndE | -1.080 | 0.452 | 0.017 |
| JamE | 1.960 | 0.606 | 0.001 |
| VARIETY : THEME CONCRETENESS | | | |
| CanE + concrete | 1.250 | 0.397 | 0.002 |
| VARIETY : REGISTER | | | |
| IrE + SpokForm | 0.692 | 0.278 | 0.013 |
| IrE + SpokInf | -0.604 | 0.287 | 0.035 |
| HKE + SpokInf | 0.679 | 0.244 | 0.005 |
| HKE + WrittenForm | -0.912 | 0.293 | 0.002 |
| HKE + WrittenInf | 0.566 | 0.220 | 0.010 |
| JamE + SpokInf | -0.703 | 0.312 | 0.024 |
| JamE + WrittenForm | 0.873 | 0.433 | 0.044 |
| NZE + WrittenForm | 0.673 | 0.295 | 0.023 |

# cross-varietal differences

Table: Cross-varietal differences in effect size; - indicates decreased effect size, + indicates increased effect size

| Variety | WeightRatio | RecPron | ThemeConcreteness |
|---|---|---|---|
| CanE | = | + | + |
| IndE | - | + | = |
| JamE | + | - | = |

# discussion

# discussion

- general processes of language production and comprehension
  - . . . shape distributional patterns in speakers‘ experience
  - . . . which gives rise to subtle variation in the probabilistic effects of different linguistic features

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  - Easy First: creates stability in effect direction
  - Plan Reuse: constantly reinforces the regularization of linguistic input $\rightarrow$ strengthens diverging statistical patterns of use
  - changes in lexis-syntax associations can result in diverging statistical regularities since the strength of effects that modulate these statistical regularities change as well

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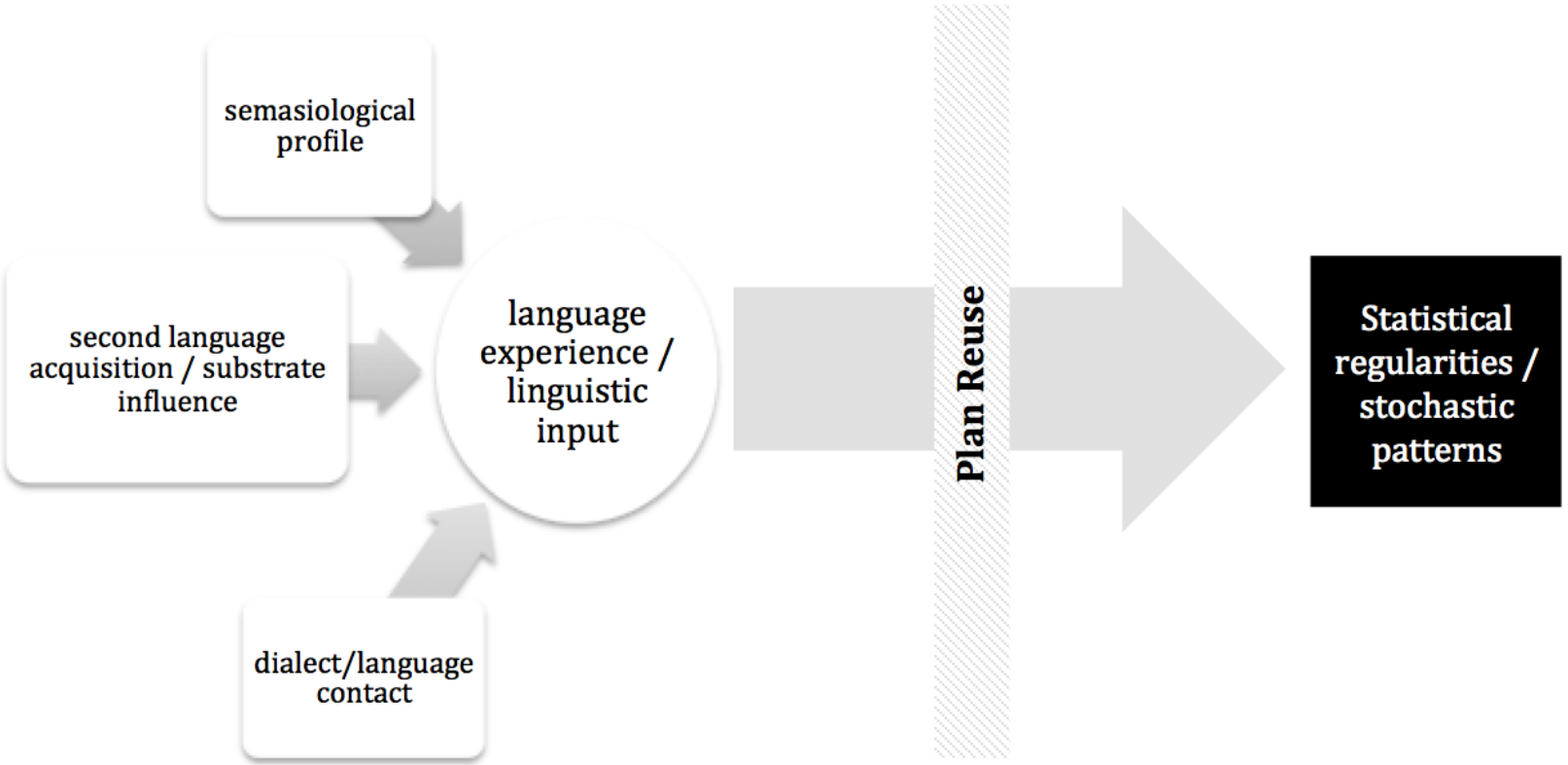
semasiological profile
second language acquisition / substrate influence
dialect/language contact
language experience / linguistic input
Plan Reuse
Statistical regularities / stochastic patterns

# language and dialect contact

- emergence of localized linguistic structure with new lexical items in syntactic constructions

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  - generalizing beyond the input
  - changes in abstract rules

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- transfer of cue strength from L1 (MacWhinney 1997)

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- 2nd lang acq.: DO is associated with certain lexical items

# why length and RecPron?

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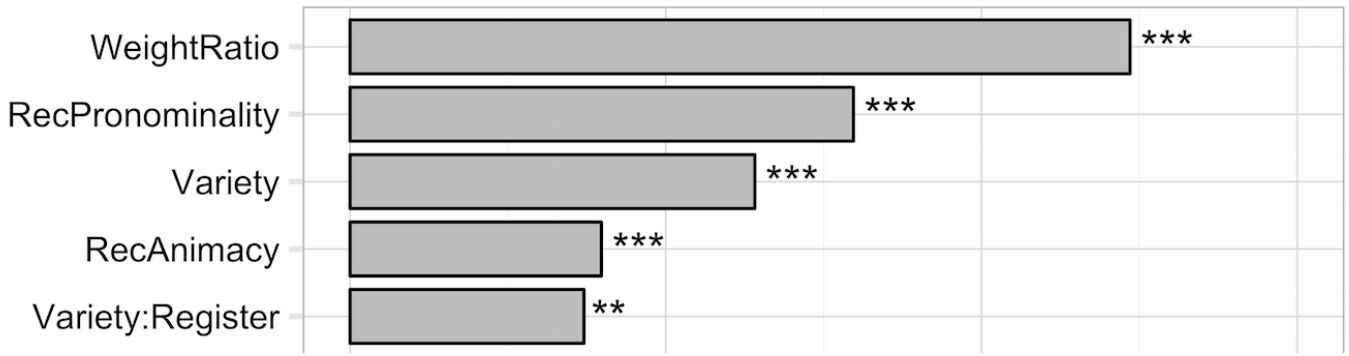
- most influential predictors = high cue validity



# how does the study fit in with previous research?

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What about recipient animacy?

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Investigating the effect of recipient animacy:

- restrict dataset to *give*
- follow procedure in Bresnan and Hay 2008 in selection of predictors
- et voilà: $\rightarrow$ recipient animacy is a significant factor!

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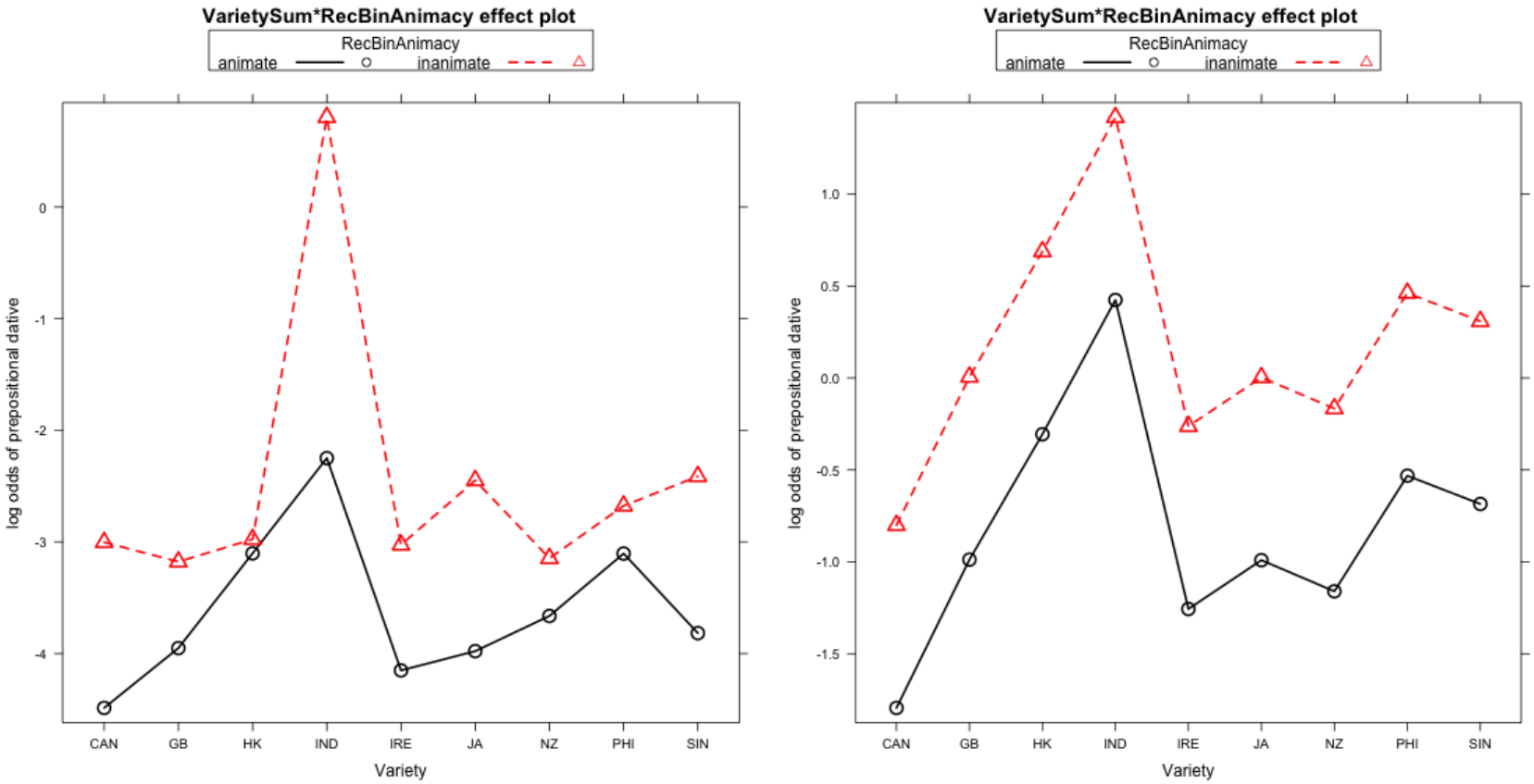


(left: GIVE model; right: all verbs)

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- . . . due to natural variation in the frequencies of specific lexical items, features and/or syntactic structures
- diverging patterns of usage are constantly reinforced by Plan Reuse
- cognitive indigenization leads to the formation of different lects = *lectalization*

# outlook

# outlook

- focus on social constraint ..
- ..and other syntactic alternations
- extend annotation (persistence)
- extend corpus material to include web-based language (GloWbE)

Thank you!

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http://wwwling.arts.kuleuven.be/qlvl/ProbGrammarEnglish.html

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